5.1 NOISE

5.1.1 Background

Potential noise impacts from the Proposed Action have three components: aircraft, highway and rail. This section will analyze baseline (year 2000) and future (year 2007) noise conditions for all three components.

Aircraft noise is often the most noticeable environmental effect associated with airport operations. If the sound is sufficiently loud or occurs frequently, it may interfere with people's activities or otherwise be considered objectionable. Aircraft noise impact is generally depicted in the form of noise contours overlaid on a map of the airport community that show which areas experience the noise from aircraft operations and the level of the noise. These contours reflect the typical operations at the airport and include daytime and nighttime arrivals, departures, and touch-and-go operations of all aircraft types. Aircraft noise is discussed in detail in later in this section.

Highway noise analysis assesses another part of the overall transportation noise environment. To the extent that project actions may change highway noise characteristics or change the relative contribution of highway noise to the overall noise exposure, it is important to characterize the existing highway noise in the airport vicinity. Highway noise is discussed in detail midway through this section.

In addition to forming part of the overall transportation noise exposure environment, rail noise is a particular interest in this Proposed Action because of the need to relocate a rail line to increase the operating margin of safety for the existing runway and comply with FAA standards. Rail noise is discussed in detail at the end of this section.

Noise is defined as any unwanted sound, and sound is defined as any pressure variation that the human ear can detect. Human beings can detect a large range of sound pressures ranging from 20 to 20 million micropascals, but only those air pressure variations occurring within a particular set of frequencies are experienced as sound. Air pressure changes that occur between 20 and 20,000 times a second, stated as units of Hertz (Hz), are registered as sound. Because the human ear can detect such a wide range of sound pressures, sound pressure is converted to sound pressure level (SPL), which is measured in decibels. The decibel (dB) is a relative measure, on a logarithmic scale, of the sound pressure with respect to a standardized reference quantity.

Humans are most sensitive to frequencies in the 1,000 to 5,000 Hz range. Since ambient noise contains many different frequencies all mixed together, measures of human response to noise assign more weight to frequencies in this range. This is known as the A-weighted sound level. Decibels on the A-weighted scale are termed "dBA." Because the scale is logarithmic, a relative increase of 10 decibels represents an SPL that is 10 times higher. However, the human ear isn't calibrated according to decibels. Humans don't perceive a 10 dBA increase as 10 times or louder; they perceive it as twice as loud. The following is typical of human response to relative changes in noise level:

- A 3 dBA change is the threshold of change detectable by the human ear
- A 5 dBA change is readily noticeable
- A 10 dBA increase is perceived as a doubling of noise level

At any given moment, a person hears different SPLs for different frequencies, and that particular mixture varies from moment to moment. Therefore, a variety of terms are used to evaluate and describe noise levels over time. Some typical descriptors are defined below:

- L_{eq} is the continuous equivalent sound level. The sound energy from the fluctuating sound pressure levels is averaged over time to create a single number to describe the mean energy or intensity level. This is a popular descriptor because L_{eq}s from different sources can be added together to get the total noise at a particular site. For continuous noise sources, such as traffic on a roadway, the L_{eq} typically represents a 1-hour period. For airports, where the noise source is not continuous, the L_{eq} may represent a 12- or 24-hour period.
- DNL (also expressed as Ldn) is the day-night equivalent sound level. It is similar to a 24-hour L_{eq} but with 10 dBA added to aircraft noise between 10 pm and 7 am to reflect the greater intrusiveness of noise experienced during these hours. Unlike L_{eq}s, DNLs cannot be added together. They are useful because of the way a DNL weights the annoyance of noise at night.
- L_{max} is the highest SPL measured during a given period of time.
- L_{min} is the lowest. SPL measured during a given period of time.
- L_{10} is the SPL exceeded 10% of the time. Similar descriptors are the L_{50}, L_{01}, and L_{90}.
- SEL is the sound exposure level. It is a single number representing the total energy of a noise event as if it were compressed into a 1-second time period.

For evaluating noise from multiple aircraft operations, the relevant noise descriptor is the 24-hour DNL. It takes into account the sound levels of all individual events that occur during an average 24-hour period, including the number of times those events occur and the time of day at which they occur.

For traffic noise from a roadway, the relevant noise descriptor is the 1-hour Leq, and it is calculated for the peak traffic period. Traffic noise attenuates at a rate of 3.0 dBA per distance doubling from a reference distance of 50 feet. Thus, a noise level of 67 dBA 50 feet from the roadway would decrease to 64 dBA 100 feet away, 61 dBA 200 feet away, 58 dBA 400 feet away, etc. This applies to sound traveling over a "hard" surface (pavement, water, or snow) or through the air from an elevated roadway. Roadway noise traveling over a "soft" surface such as grass or through vegetation will attenuate a little faster—at about 4.5 dBA per distance doubling.

For rail noise, both the L_{eq} and the Ldn (DNL) may be used in evaluating potential noise impacts. The L_{eq} is calculated for the noisiest hour, whereas the Ldn may be calculated for 12-hour and 24-hour periods.

Because the decibel is on a logarithmic scale, the units cannot be added and subtracted arithmetically. To add together decibels, one must convert the sound pressure levels in decibels back into a scale that is additive, such as sound pressure in micropascals, add them together, then reconvert the total back into sound pressure level in decibels. The formula for this is:

$$L_{total}\ dB = 10 \log \sum_{i=1}^{N} 10^{(L_i/10)}$$

This equation shows that louder noise sources dominate the total noise level. The louder the noise, the more important it is in determining the total noise level and any potential noise level impacts. Although the formula shown above is the most accurate way of adding together noise levels, a general rule of thumb for combining noise levels is shown below. It was obtained from *Highway Noise Fundamentals*, published by the U. S. Department of Transportation, Federal Highway Administration, September 1980.

Where two decibel values differ by:	Add the following amount to the higher value:
0 or 1 dB	3 dB
2 or 3 dB	2 dB
4 or 9 dB	1 dB
10 dB or more	0 dB

5.1.2 Aircraft Noise Analysis Methodology

The standard methodology for analyzing noise at airports involves the use of a computer simulation model. The Federal Aviation Administration (FAA) created and continually upgrades the Integrated Noise Model (INM) for use at airports in the United States. It is the FAA's only accepted model because it offers a standardized method for analyzing noise impacts from an extremely wide variety of aircraft types under all normal operating conditions. In addition, it has proven to be extremely effective at helping airport operators anticipate community reaction to aircraft noise. The most recent version of the Integrated Noise Model (INM), version 6.1, was used in preparing the Gary/Chicago International Airport noise contours. It includes flight characteristics and noise data for all commercial and general aviation aircraft, and many military aircraft as well. For each aircraft in an INM study, data for flight profiles and noise curves are used to compute noise due to aircraft arrivals, movement on the ground, departures, and touch-and-go training flights, as appropriate. For this study, helicopter data (flight profiles and noise curves), which is not standard in the INM, was imported from a database originally distributed with INM 6.0c and adopted by most recent version of INM 6.1. The helicopter data was then integrated with the fixed-wing data according to the procedural memo provided with the INM 6.0c software.

The INM describes aircraft noise in terms of a wide variety of metrics or noise descriptors, the most popular of which is the *Day-Night Average Sound Level* (DNL). DNL is the metric preferred by the FAA, Environmental Protection Agency (U.S. EPA), and Department of Housing and Urban Development (HUD), among others, as an appropriate measure of cumulative noise exposure. DNL is used for all types of transportation noise and has proven to be a very reliable indicator of community reaction to various noise levels. For airport noise analyses, the analyst gathers data on one year's worth of flight operations and then computes an "annual average day" of arrivals and departures by all the aircraft typically using the airfield. This annual average day is created by counting all aircraft operations over the course of a year and dividing by 365 to arrive at a 24-hour period that represents an average day. The reason for using an annual average day is that flight patterns tend to shift seasonally, and it is important to accurately represent year-round operations. A +10 decibel weighting is added to noise events occurring during the nighttime hours of 10 p.m. to 7 a.m. This noise penalty reflects the fact that nighttime noise is considered more intrusive and bothersome than daytime noise.

The INM works by computing the noise levels for each flight and using logarithmic formulas to sum up the total aircraft noise levels in the form of DNL values at a large number of grid points within the airport study area. These grid points are then connected to depict noise level footprints or contours, similar in concept to topographical contours, but showing the noise levels in the airport community. Noise exposure is typically mapped showing contour levels of 65, 70 and 75 DNL. These are the levels that correspond to various categories of land use compatibility as developed by the FAA, HUD and U.S. EPA.

There is a difference between noise exposure and noise impact. Noise impact is the significant adverse effect that noise exposure has on the surrounding community. Impacts typically are defined according to the level of noise exposure and the type of land use. The concept of *land use compatibility* has arisen from the studies of human tolerance to aircraft noise. Comparing the level of noise exposure around Gary/Chicago International Airport to Federal standards makes it possible to assess the impact that aircraft noise will have on the community as a whole. Studies by government agencies and private researchers, in particular those by HUD and FAA, have defined the compatibility of these different land uses with varying noise levels. The following table designated **Exhibit 5.1-1** (FAA Table A-1) presents the FAA determination of land uses that are normally compatible with various DNL noise levels resulting from aircraft activity.

EXHIBIT 5.1-1 FAA Table A-1: Land Use Compatibility With Yearly Day-Night Average Sound Levels						
	Yearly Day-Night Average Sound Level (Ldn) in Decibels					
Land Use	**Below 65**	**65-70**	**70-75**	**75-80**	**80-85**	**Over 85**
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoria, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail – building materials, hardware, and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade – general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communications	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Numbers in parentheses refer to notes.

* The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute Federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise-compatible land uses.

KEY TO TABLE A-1

SLUCM = Standard Land-Use Coding Manual.
Y (YES) = Land Use and related structures compatible without restrictions.
N (No) = Land Use and related structures are not compatible and should be prohibited.
NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35 = Land Use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.

NOTES FOR TABLE A-1

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems. (2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low. (3) Measures to achieve NLR 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low. (4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low. (5) Land-use compatible provided special sound reinforcement systems are installed. (6) Residential buildings require an NLR of 25. (7) Residential buildings require an NLR of 30. (8) Residential buildings not permitted.

Source: Federal Aviation Regulations Part 150, Appendix A, Table 1.

As Exhibit 5.1-1 shows, the FAA and other Federal agencies have determined that daytime noise exposures below 65 dBA and nighttime exposures below 55 dBA are compatible with most land uses. Considering the 10 dBA penalty for nighttime noise, this is equivalent to a daytime DNL of 65 dBA. Generally, residential land use, schools, daycare centers and other noise sensitive facilities are *not* advisable in areas where the noise level exceeds 65 DNL because of annoyance and activity interference associated with the noise. For areas with noise exposures of 65 to 70 DNL approximately 15 percent of the population living within the contour zone will be highly annoyed by the noise. Hospitals, nursing homes, churches, concert halls and auditoria are compatible if the building provides adequate noise reduction, defined here as an outdoor-to-indoor noise attenuation of 25 dB. Industrial and commercial land uses are generally compatible with noise exposure levels higher than those recommended for residential use.

Although Exhibit 5.1-1 shows the compatibility of different land uses with a 65 DNL, it does not indicate how an impact would be determined for a Proposed Action, or for locations where the DNL already reaches 65 or higher. The FAA's *Airport Environmental Handbook*, however, provides guidance for defining impacts. It specifies that the FAA's threshold of significance is an increase of 1.5 Ldn in noise over any noise sensitive area located within the 65 Ldn contour. (Ldn and DNL are interchangeable terms). Based on this, an impact from aircraft noise would occur when:

- A noise sensitive use is subjected to a DNL of 65 or higher under the Proposed Action, and it was below 65 DNL under the No Action alternative
- A noise sensitive use that was within the 65 DNL under No Action conditions would experience an increase in DNL of 1.5 under the Proposed Action.

5.1.3 Existing Conditions -- 2000

The INM uses airport specific input data that include airport elevation, average annual temperature, location and length of airport runways, flight tracks indicating where aircraft fly, number and type of airport operations by all aircraft categories, and the assignment of specific aircraft with specific engine types at specific takeoff weights to individual flight tracks. This information was prepared for operations at Gary/Chicago International Airport during 2000. A complete set of data for 2001 operations was available, but was deemed inappropriate as a baseline because flight levels following September 11, 2001 were substantially lower than those before the tragic event of September 11, 2001 and not typical of normal airport operations. Data from 2002 and 2003 also are not typical because the airline industry still hadn't recovered and Gary/Chicago International Airport didn't have a scheduled air carrier. It only was in early 2004 that the airport was able to restore scheduled service. The FAA believes that the 2000 data is sufficiently similar to the current condition that it can be used to represent existing conditions.

5.1.3.1 Baseline Aviation Operations and Fleet Mix

Operations and fleet mix data (the "mix" of aircraft in the "fleet") were developed for the INM based on information gathered from four available sources, including 2001 Airport Master Plan, Airport Traffic Control Tower (ATCT) counts, Airport/Tower staff knowledge, and third-party IFR radar data, each providing part of the overall data set needed to run the noise model. Airport operations data from the 2001 Airport Master Plan were developed based on operations pre-dated 2000. These data were evaluated and modified based on actual 2000 ATCT. Since neither the 2001 Airport Master Plan nor the ATCT data provided specific information required for INM modeling. Airport and Tower staff members were interviewed regarding year 2000 operations, runway uses, and flight tracks information. Finally, an independent source of IFR data (RLM software) provided two months worth of data – April and October 2000 – so that a representative sample of aircraft types could also be analyzed to determined aircraft types and fleet mix in 2000 at Gary/Chicago International Airport.

ATCT counts give the total number of operations that occurred at the airport during the hours the Tower was open in 2000, 5 a.m. to 9 p.m. Tower staff recorded the number of operations (departures, arrivals or overflights) during open hours and indicated the general category of each aircraft flying. Year 2000 ATCT operations records are provided in **Exhibit 5.1-2** according to the basic categories of Air Carrier (AC), Air Taxi (AT), General Aviation (GA) and Military (MI). Operations for itinerant aircraft not based at the airport are shown for each one of these categories. In addition, the first three categories are lumped together under the category of "Civil" for local aircraft, listed along with local Military aircraft operations. Taken together, the itinerant and local operations comprise all the departures and arrivals occurring at Gary/Chicago International Airport. All flight operations that file instrument flight plans with the FAA radar control system are categorized as IFR, for Instrument Flight Rules. Many aircraft at Gary/Chicago International Airport, however, choose not to file such flight plans and fly under VFR, or Visual Flight Rules, conditions. The number of these VFR operations is computed by the ATCT for record-keeping purposes. Finally, the ATCT notes overflight traffic not using the Gary/Chicago International Airport facility but passing through the airspace above the airport and making contact with the Gary Tower. These operations have been excluded from the noise analysis because their altitude renders their contribution to noise levels at ground level insignificant and their presence is not under Gary/Chicago International Airport control. **Exhibit 5.1-3** summarizes and restates the ATCT operation records in terms of aviation groups.

EXHIBIT 5.1-2 2000 Gary/Chicago International Airport Traffic Control Tower Operations Records												
	ITINERANT					LOCAL						
Month	AC	AT	GA	MI	Total	CIVIL	MIL	Total	TOTAL	Actual IFR	Over-flight	Computed VFR
Jan.	142	72	1,090	4	1,308	1,369	0	1,369	2,677	686	358	1,991
Feb	116	45	1,285	6	1,452	2,028	4	2,032	3,484	679	346	2,805
Mar	109	76	1,662	15	1,862	2,726	7	2,733	4,595	696	819	3,899
Apr	145	59	1,672	40	1,916	2,331	45	2,376	4,292	726	689	3,566
May	199	76	1,544	67	1,886	2,784	15	2,799	4,685	795	777	3,890
Jun	183	73	1,856	15	2,127	3,035	121	3,156	5,283	825	1040	4,458
Jul	135	33	2,127	16	2,311	3,292	27	3,319	5,630	690	1610	4,940
Aug	163	60	2,043	239	2,505	2,910	329	3,239	5,744	897	1202	4,847
Sep	147	79	2,226	25	2,477	3,400	48	3,448	5,925	706	1042	5,219
Oct	139	73	1,830	22	2,064	3,096	4	3,100	5,164	770	1000	4,394
Nov	139	73	1,415	14	1,641	1,699	16	1,715	3,356	735	618	2,621
Dec	193	43	885	2	1,123	730	46	776	1,899	655	406	1,244
TOTAL	**1,810**	**762**	**19,635**	**465**	**22,672**	**29,400**	**662**	**30,062**	**52,734**	**8,860**	**9,907**	**43,874**

Source: Gary/Chicago International Airport Tower Operations Records, 2000.

EXHIBIT 5.1-3 2000 Gary/Chicago International Airport Tower Count by Aviation Category	
Category	**Tower Ops**
Air Carrier and Cargo Air Carrier	1,810
Air Taxi	762
GA*	4,9035
Military	1127
TOTAL	**52,734**

** GA operations are combined from Itinerant GA plus all local Civil operations.*
Source: Gary/Chicago International Airport Tower Operations Records, 2000.

The ATCT operations records provide an overall set of data for analyzing aircraft noise, but they lack the necessary level of detail regarding specific aircraft types. The INM requires a greater level of detail than Exhibit 5.1-3 provides, or can be gained from either the ATCT operations records or the 2001 Airport Master Plan data. Airport and ATCT staff members were interviewed regarding year 2000 operations and fleet mix to determine which specific aircraft types use Gary/Chicago International Airport. Additionally, an independent source for IFR data (RLM Software) provided two months of data from April and October 2000 so that a representative sample of aircraft types could be analyzed. RLM Software collected data from the FAA central radar tracking facility and sifted it to provide information about Gary/Chicago International Airport IFR flight activity for the requested time periods, providing spreadsheet data that could be analyzed by time of day and aircraft type. The relative proportions of aircraft types were then applied to the ATCT operations records. April and October were selected for analysis because they are considered typical activity months. As Exhibit 5.1-2 shows, traffic levels increase during the summer months, but most of the additional traffic is generated by GA users typically flying under VFR rules rather than IFR. GA users would not be reflected in the data from the independent source.

VFR aircraft types were identified and modeled with the help of airport and ATCT staff. As a rule, air carrier, cargo air carrier, and air taxi operations fly under IFR rules. So, VFR operations were assumed to involve GA, military and helicopter aircraft only, and were distributed among those aircraft types with many of the operations assigned to training (touch-and-go) flights in accordance with typical flight patterns. Airport and ATCT staffs indicate that these activities constitute a substantial portion of VFR operations, especially on the shorter, crosswind runway.

As previously noted, the data presented in both Exhibits 5.1-2 and 5.1-3 only reflect aircraft operating at Gary/Chicago International Airport in 2000 between the hours of 5 a.m. and 9 p.m. To determine the number and type of operations between 9 p.m. and 5 a.m., the independent IFR data for April and October was sorted by time of operation to identify activity during the hours that the ATCT is closed. The number of flights for each aircraft type at night for two months was analyzed and characterized, and that information was used as the basis for annual nighttime operations. The INM definition of day and night, with daytime defined as 7 a.m. to 10 p.m., was then factored into the operations data, and a complete set of operations by aircraft types, with the INM day/night split, was prepared. **Exhibit 5.1-4** shows the aircraft types used for the INM analysis, giving the total number of operations flown by each aircraft type and the number of daytime and nighttime operations modeled for the annual average day in 2000.

The number of operations for 2003 was examined to confirm that 2000 continues to be an appropriate year to use for Baseline operations. Whereas Exhibit 5.1-2 showed total operations of 52,734 for 2000, the airport data indicated that 2003 operations totaled 46,165. This difference of approximately 6,500 operations was largely in the category of air carrier and cargo air carrier operations and was due primarily to the departure of Pam Am Airways. On February 25, 2004, Southeast Airlines began operations at the airport, and the resulting number of annual operations will increase again. Southeast will mostly use MD-80 and DC-9 aircraft, which are not reflected in the baseline operations for 2000, but are incorporated into the projections of 2007 operations.

EXHIBIT 5.1-4 2000 Flight Operations by Aircraft Type							
INM Aircraft Type	**Description**	**2000 Daytime Operations**	**2000 Nighttime Operations**	**Total 2000 Operations**	**Average Day (7 am – 10 pm) Departures or Arrivals***	**Average Night (10 pm – 7 am) Departures or Arrivals***	**Daily Touch & Gos**
727D17	Boeing 727	1,116	24	1,140	1.529	0.033	
737N17	Boeing 737	49	-	49	0.067	-	
CNA441	Twin-engine TurboProp, 9,900 Lb.	379	18	397	0.520	0.025	
DC860	Douglas DC8	5	6	11	0.007	0.008	
DC93LW	Douglas DC9	184	132	316	0.252	0.181	
L188	Lockheed Electra	22	12	34	0.030	0.016	
DHC6	Twin-engine TurboProp, 12,500 Lb.	738	114	852	1.011	0.156	
DHC8	Twin-engine TurboProp, 34,500 Lb.	24	6	30	0.033	0.008	
BEC58P	Twin-engine Propeller	9,187	42	9,229	12.585	0.058	
CIT3	Citation VII	776	0	776	1.063	0	
CL600	Twin-engine jet, 36,000Lb.	388	-	388	0.532	-	
CL601	Canadair 610	1,811	6	1,817	2.481	0.008	
CNA500	Citation II	4,335	60	4,395	5.938	0.082	
FAL20	Falcon 20	1,035	78	1,113	1.418	0.107	
GASEPF	Single-engine FP Propeller	4,529	18	4,547	1.204	0.025	10.0000
GASEPV	Single-engine VP Propeller	8,792	10	8,802	1.944	0.014	20.0000
GIIB	Gulfstream II and III	388	0	388	0.532	0.000	
GIV	Gulfstream IV and V	647	12	659	0.886	0.016	
HS748A	Gulfstream I	129	24	153	0.177	0.033	
IA1125	IA Astra	3,364	18	3,382	4.608	0.025	
Lear25	LearJet 24, 25	6,211	60	6,271	8.508	0.082	
Lear35	LearJet 31, 35	2,717	54	2,771	3.722	0.074	
MU3001	Citation II	2,135	0	2,135	2.925	0.000	
C130	C130 Hercules	61	0	61	0.084	0.000	
Mil/Helo	Helicopter	3,604	20	3,624	9.929	0.027	
Totals		**52,626**	**714**	**53,340**	**56.99**	**0.978**	**30.2000**

* There are an equal number of departures and arrivals

Source: Gary/Chicago International Airport Staff and RLM Software, Inc.

The mixture of aircraft types in Exhibit 5.1-4 reflects changing technology in aircraft engines and phase out-phase in regulations. Noise from commercial aircraft weighing over 75,000 lbs has been influenced by noise reduction technology. Stage 1 aircraft are the oldest and noisiest, and they are not allowed at airports. The more recent Stage 2 aircraft are those that have been shown under 14CFR, Part 36 to comply with Stage 2 noise levels. As of January 1, 2000, however, they also were no longer permitted at airports unless they have been retrofitted with "hush kits" to bring them into compliance with Stage 3 requirements. Stage 3 aircraft represent further advances in reducing noise levels, particularly during approach and landing. Although some of the aircraft, e.g. 727s, shown in Exhibit 5.1-4 are listed as Stage 2 aircraft in the INM database, they have been modified (with hush kits) to comply with Stage 3 requirements.

5.1.3.2 Baseline Runway and Flight Track Usage

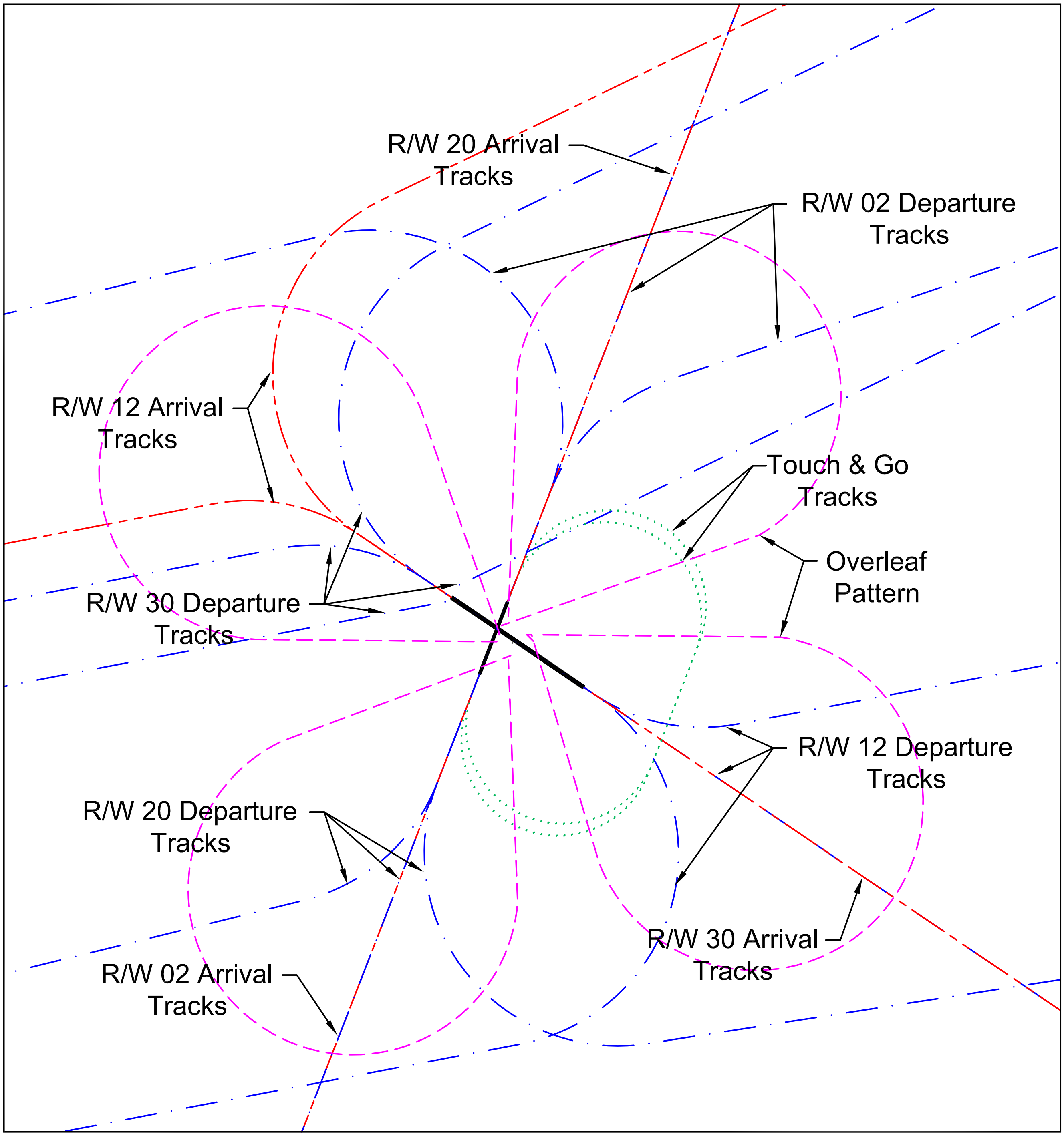
As described in earlier chapters, Gary/Chicago International Airport has two pairs of runways available for flight operations. The use of a specific runway is typically influenced by wind direction, as all fixed-wing aircraft operations should be into the wind. The choice of runway is generally more flexible for low wind conditions than for strong winds. At Gary/Chicago International Airport, winds are generally from the west and favor the use of Runway 30 most of the time. However, when wind conditions allow, GA aircraft often request the "crosswind" runway, designated 2-20, so that they may avoid interfering with faster jet traffic on the primary runway, Runway 12-30. Aircraft size and weight also affect runway use. Air carrier, cargo air carrier and the C130, as well as the larger GA jets, cannot use Runway 2-20 because it is too short. Runway utilization was assessed using the 2001 Airport Master Plan and then validated and refined using information provided by airport and ATCT staff and field observations. (Neither the ATCT operations records nor the independent IFR data source have information about runway use nor flight tracks.) **Exhibit 5.1-5** gives the runway utilization percentages and flight track assignments used in the INM modeling. The designated flight tracks for the helicopters are directly north towards the lake over industrial and commercial land uses and then turn to their designated destinations to minimize potential noise exposures at the adjacent neighborhoods. However, there are possibilities that some helicopters may not follow the northerly route, since they can take off and land at various points all around the airport and the designated flight track is voluntary in nature. To simulate this worst-case condition, helicopter traffic in the INM was assigned evenly to four looping tracks forming a clover-shape to distribute operations as widely as possible.

Due to the current location of the Elgin Joliet & Eastern (EJ&E) Railway tracks, aircraft approaching Runway 12 cannot maintain a safe distance above the tracks if they land at the beginning (threshold) of the runway. Therefore, the landing point for Runway 12 is 715 feet beyond the beginning of the runway. This is a 715 foot displaced threshold for the approach to Runway 12.

EXHIBIT 5.1-5 2000 Runway and Flight Track Utilization Percentages by Aircraft Group							
Runway (Subtrack)	Air Carrier, Cargo Air Carrier & C130	Air Taxi	GA Jets, Turboprops & Larger Props	GA Single-Engine Props		Helicopters	Overall Runway Utilization Rate
				Itinerant	Touch & Goes		
2	0.00%	2.00%	2.00%	20.00%	50.00%	0.00%	12.49%
West	0.00%	1.00%	1.00%	7.14%			
North	0.00%	0.00%	0.00%	5.71%			
East	0.00%	1.00%	1.00%	7.14%			
20	0.00%	2.00%	2.00%	20.00%	50.00%	0.00%	12.49%
East	0.00%	1.00%	1.00%	7.14%			
South	0.00%	0.00%	0.00%	5.71%			
West	0.00%	1.00%	1.00%	7.14%			
12	20.00%	16.00%	16.00%	10.00%	0.00%	0.00%	11.51%
North	5.00%	8.00%	8.00%	4.00%			
East	0.00%	0.00%	0.00%	2.00%			
South	15.00%	8.00%	8.00%	4.00%			
30	80.00%	80.00%	80.00%	50.00%	0.00%	0.00%	56.72%
North	20.00%	40.00%	40.00%	25.00%			
South	60.00%	40.00%	40.00%	25.00%			
Helicopter Tracks	0.00%	0.00%	0.00%	0.00%		100%	6.79%
Number of Ops in 2000	2,161	882	33,324	2,236	11,023		100% = 53,340

Source: Gary/Chicago International Airport

The figure of **Exhibit 5.1-6** displays the flight tracks used in the INM model. As Exhibit 5.1-6 shows, all IFR traffic and much of the VFR traffic departs the airport vicinity and flies toward either the northeast or southwest. This is because the Chicago area airspace is controlled so that aircraft from Gary/Chicago International Airport are directed to specific navigational “gates” in these two directions before exiting the Chicago area. Airspace control has been designed to manage the high levels of traffic using Chicago O’Hare International Airport and Midway International Airport, and traffic at these two large facilities constrains flight patterns around Gary/Chicago International Airport. The gate to the northeast of Gary is located near Niles, Michigan, and the southwestern gate is in Peotone, Illinois. Departure traffic has been evenly divided between these two directions. A small percentage of the single-engine GA aircraft flying under VFR rule departs Runways 2, 12 and 20 and stays on the runway heading rather than flying to the gates as they exit the area. Due to traffic patterns at Midway, no Gary traffic flies directly west from Gary/Chicago International Airport. As previously noted, helicopter traffic is modeled as dispersed around the airfield, and no gate-type routing is assumed.



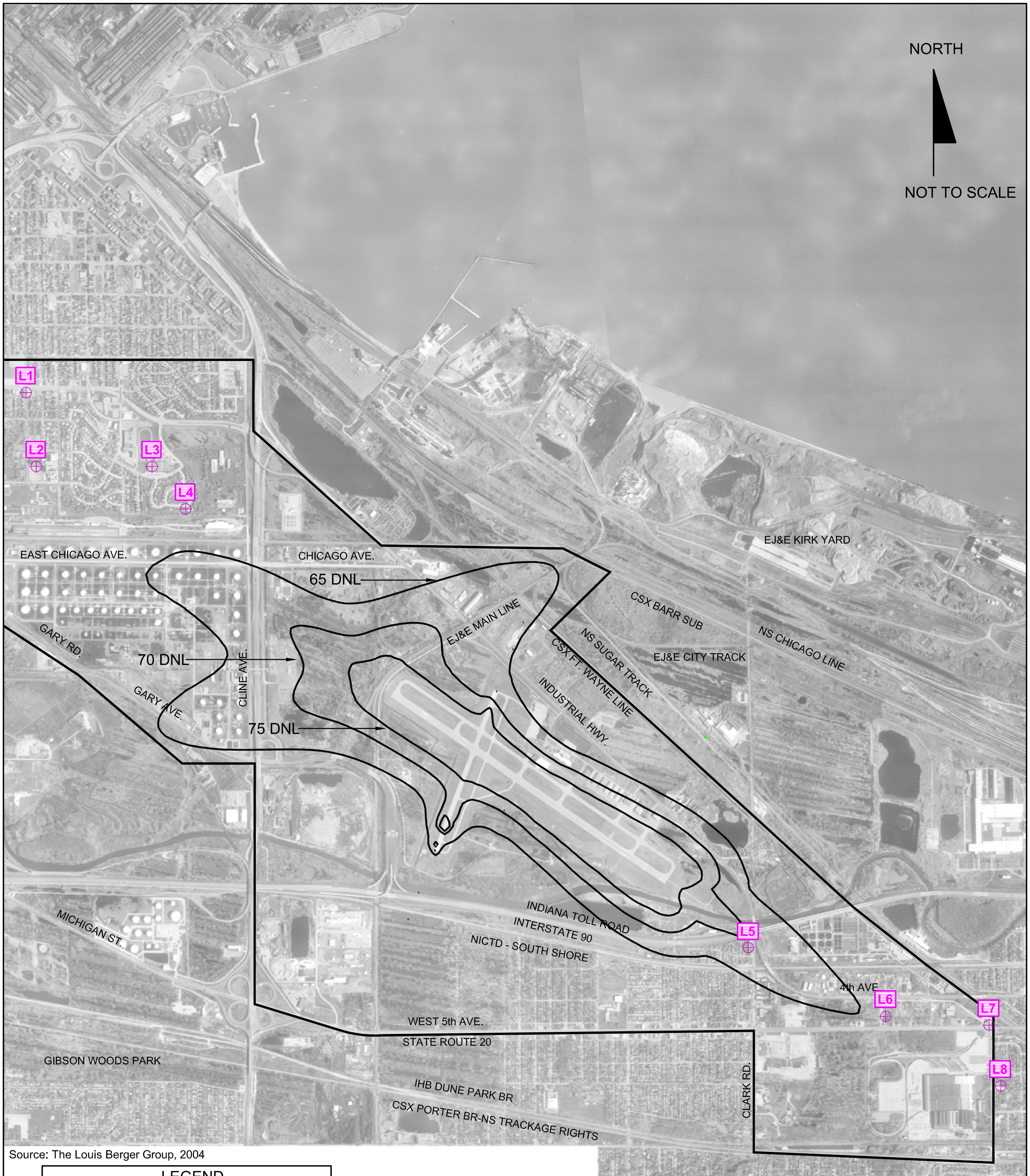
Source: The Louis Berger Group, Inc., 2003.

LEGEND

- Overleaf Pattern
- Arrival Tracks
- Departure Tracks
- Touch & Go Tracks

EXHIBIT 5.1-6
Flight Tracks

April 8, 2004



Source: The Louis Berger Group, 2004

LEGEND
Location Point Key: L1- Corner of Grand and Columbus L2- St. Catherine's Hospital L3- Block Jr. High School L4- Butternut Street, Southeast Loop L5- Clark Street and West 4th Street L6- Mobile Home Park L7- West 5th and Chase Street L8- West 7th Court

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EXHIBIT 5.1-7
2000 Noise Contours

April 8, 2004

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5.1.3.3 Results of Aviation Baseline 2000 Noise Analysis

The INM computes noise exposure for a variety of metrics, each of which is useful for a different aspect of analysis. Noise exposure for 2000 has been evaluated in terms of DNL, previously described, as well as in terms of Time Above. Each of these will be discussed in detail below. Contours for both metrics have been superimposed on an aerial photograph to display areas of greater and lesser noise exposure. Finally, values of these noise metrics have been computed at eight representative locations throughout the community.

5.1.3.4 Baseline Day-Night Average Sound Level (DNL) Noise Exposure

The figure in **Exhibit 5.1-7** displays the results of the DNL noise analysis for Gary/Chicago International Airport in 2000, using the data set described above. This shows current conditions based on actual aircraft operations, so the shape and extent of the contours reflect the underlying runway and flight track usage. DNL is the metric that is considered most useful for long-term community land use planning and it is the metric required by the FAA and the U.S. EPA for all EIS analysis. The combined effects of close-in residential development and heavy use of the primary runway result in a portion of a residential neighborhood off the southeast end of Runway 12-30 being included within the 65 DNL noise contour.

5.1.3.5 Areas of Baseline Noise Exposure and Homes Impacted

Exhibit 5.1-8 presents the results of the INM analysis for 2000 Baseline Conditions. Based on Exhibit 5.1-1, homes within the 65 DNL contour are significantly impacted by aircraft noise. Under Baseline Conditions, the 65 DNL encompasses 1,120 acres (1.8 square miles), which includes 71 residences. The number of homes identified in Exhibit 5.1-8 is based on a field windshield survey plus analysis of aerial photography. No noise sensitive land uses lie within the 70 or 75 DNL contours. Each successive contour encloses the higher levels; therefore the acreages and numbers of homes are inclusive of the higher levels. For example, the acreage and number of homes for 65 dBA includes all areas within 65, 70, 75 and above dBA levels.

EXHIBIT 5.1-8
2000 Areas of Noise Exposure and Number of Homes Exposed

DNL Contour (dB)	Area in Acres	Residences Areas Above the Level Defined	Schools Areas Above the Level Defined	Hospitals Areas Above the Level Defined
65	1,120.3	71	0	0
70	470.6	0	0	0
75+	238.8	0	0	0

Source: INM 6.1 model

5.1.3.6 Baseline Noise Metric Values for Locations in the Community

In addition to plotting noise contours, the INM also calculated noise levels at specified noise-sensitive locations within the community. Exhibit 5.1-7, the DNL noise contour map, shows eight specific locations for which noise levels have been computed by the INM. These locations were selected because they are near homes, schools and a hospital, in the vicinity of the northeast and southeast ends of Runway 12-30. They serve as additional indicators of aircraft noise levels in the community. **Exhibit 5.1-9** lists the eight location points and their DNL values. They range from 52.4 at the corner of Grand Boulevard and Columbus Drive to 68.2 at the corner of Clark Street and 4th Avenue.

EXHIBIT 5.1-9
2000 DNL Values at Noise Sensitive Locations

Location	DNL (dBA)
L1. Corner of Grand Blvd & Columbus Drive	52.4
L2. St. Catherine Hospital	55.8
L3. Block Jr. High School	60.0
L4. Southeast loop of Butternut St.	62.1
L5. Clark St. & W. 4th Ave.	68.2
L6. Mobile Home Park off West 5th Ave. (Whitscomb St)	63.2
L7. Corner of West 5th Ave. & Chase St.	56.6
L8. West 7th Court	58.7

Source: INM 6.1

5.1.4 Future Conditions – 2007

Three future conditions were modeled in regard to aircraft noise levels: Future 2007 No Action, Future 2007 Runway 12-30 FAA Standards and Future 2007 Extended Runway 12-30. All three conditions include the operations of several units of the Indiana Army National Guard (Guard), which are authorized by Congress to be relocated to Gary/Chicago International Airport. None of the proposed landside improvements or preservation of areas for future development would change the future number of operations, aircraft mix, flight tracks, or other conditions that affect aircraft noise levels.

5.1.4.1 Future Operations and Fleet Mix

Growth rates approved by the FAA were used to develop future operations for each of the major categories: 1) Air carrier, air taxi, and air cargo operations; 2) general aviation operations; and 3) military operations. These growth rates were applied to the 2000 operations shown in Exhibit 5.1-4**,** resulting in the operations shown in **Exhibit 5.1-10**. Growth is highest for the commercial categories (air carrier, air taxi, and cargo) of operations. However, the growth rate of 4.07% per year is applied to a relatively small number of commercial operations. Following a drop in operations by 2005, the growth rate of 4.07% per annum between 2005 and 2007, resulted in a net decrease from 2,982 operations in 2000 to 2,778 in 2007. The General Aviation category (not

EXHIBIT 5.1-10 2007 Flight Operations by Aircraft Type							
INM Aircraft Type	Description	2007 Daytime Operations Annual	2007 Nighttime Operations Annual	Total Annual 2007 Operations	One Day (7 am – 10 pm) Departures or Arrivals*	One Night (10 pm – 7 am) Departures or Arrivals*	Daily Touch & Gos
Air Carrier, Cargo Air Carrier, & C130							
727EM2*	Boeing 727	29	1	30	0.040	0.001	
MD-80*	MD-80	1,011	21	1,032	1.384	0.029	
737N17*	Boeing 737	46	0	46	0.063	0.000	
CNA441	CNA441	353	17	370	0.484	0.023	
DC93LW	Douglas DC92	171	123	294	0.807	0.168	
DC870*	Douglas DC8	5	6	11	0.030	0.008	
L188	Lockheed Electra	20	11	31	0.085	0.015	
DHC7*	Turboprop, 41,000 lbs	120	22	142	0.389	0.031	
C130	C130 Hercules	61	0	61	0.084	0.000	
Subtotal		**1,816**	**201**	**1,956**	**2.488**	**0.275**	
Air Taxi							
DHC6	Twin-engine TurboProp, 12,500 lbs	688	106	794	0.942	0.145	
DHC8	Twin-engine TurboProp, 34,500 lbs	22	6	28	0.031	0.008	
Subtotal		**710**	**112**	**822**	**0.972**	**0.153**	
General Aviation Jets, Turboprops, & Larger Props							
BEC58P	Twin-engine Propeller	13,927	64	13,991	19.078	0.087	
CIT3	Citation VII	2,779	15	2,794	3.807	0.021	
CL600	Twin Engine Jet	588	0	588	0.806	0.000	
CL601	Canadair 610	2,745	9	2,754	3.761	0.012	
CNA500	Citation II	6,572	91	6.663	9.003	0.125	
FAL20	Falcon 20	1,569	118	1,687	2.149	0.162	
GIIB	Gulfstream II and III	588	0	588	0.806	0.000	
GIV	Gulfstream IV and V	981	18	999	1.344	0.025	
IA1125	IA Astra	5,100	27	5,127	6.986	0.037	
Lear25	LearJet 24, 25	6,211	60	6,271	8.508	0.082	
Lear35	LearJet 31, 35	5,721	97	5,818	7.837	0.133	
MU3001	Citation II	3,237	030	3.237	4.434	0.000	
Subtotal		**50,018**	**499**	**50,517**	**68.518**	**0.684**	
GA Single-Engine Props							
GASEPF	Single-engine FP Propeller	6,866	27	6,893	4.405	0.037	10.000
GASEPV	Single-engine VP Propeller	13,328	15.2	13,343	8.158	0.021	20.200
Subtotal		**20,194**	**42**	**20,236**	**12.563**	**0.058**	**30.200**
Helicopters							
H500D	2,500 lbs	4,002	30	4,032	0.446	0.041	
S70 **	20,250 lbs	4,380	0	4,380	0	0.0	
Subtotal		**8,382**	**30**	**8,412**	**0.643**	**0.041**	
Grand Total		**81,120**	**884**	**82,004**	**96.247**	**1.211**	**30.200**

*Denotes replacements for aircraft used for 2000 analysis
** Helicopters associated with Guard operations

including touch and goes) is projected to grow by 1.27% per year, but this rate is applied to a relatively high number of operations in this category, resulting in an increase from 33,324 operations in 2000 to 50,516 operations in 2007. Military operations are projected to decrease substantially in comparison to Baseline Conditions. However, the FAA growth rates do not account for the Guard facility planned for 2007. Therefore, the INM runs included additional annual helicopter operations for the Guard based on information in an environmental document prepared for the Guard. All Guard operations are limited to daytime training operations.

Some aircraft used in the 2000 analysis were replaced based on discussions with airport staff regarding trends in aircraft use, and review of the INM 6.1 database for similar types of aircraft to replace older models. Specifically, the majority of the 727s and some 737s operated in 2000 are projected to be replaced by MD-80 in 2007, reflecting the industry trend of utilization of low noise aircrafts. The replacements would result in less noise emission compared to 2000 condition. The aircraft used for the INM analysis for 2007 No Action Conditions are shown in Exhibit 5.1-10.

5.1.4.2 Future Runway and Flight Track Usage

For 2007 future No Action and Build Conditions, the runway and flight track usage by type of aircraft varies slightly from 2000 Baseline Conditions due to the different growth rates for the categories as shown in **Exhibit 5.1-11**. The Guard helicopter operations were dispersed evenly on the four helicopter tracks. Runway 12 would continue to have a 715-foot displaced threshold.

5.1.5 Results of Future Aviation Noise Analysis

5.1.5.1 No Action

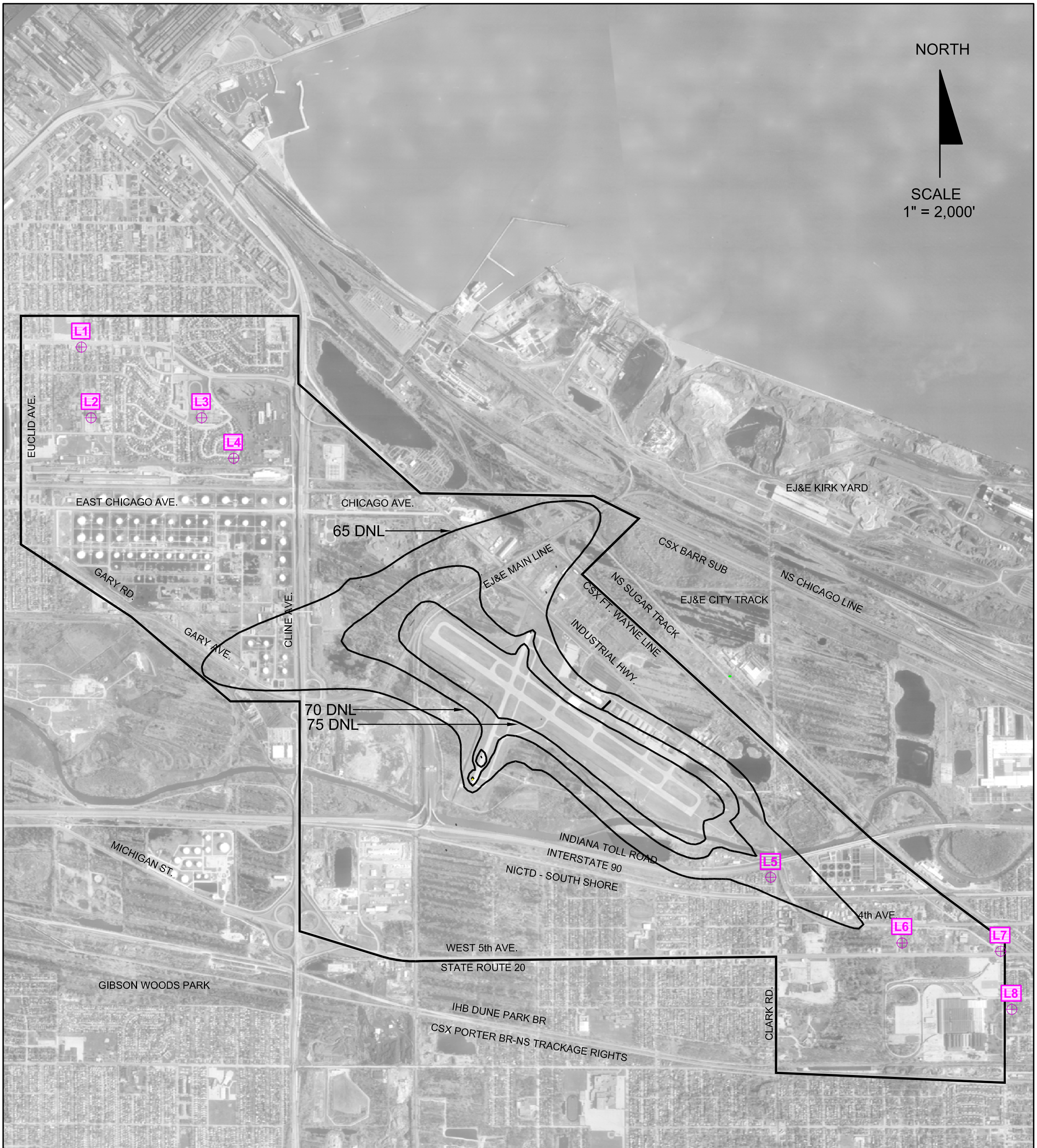
5.1.5.1.1 No Action, Future Day-Night Average Sound Level (DNL) Noise Exposure

The No Action scenario assumes the airport would continue to operate without any new development. Under these conditions the project area would continue to function as it is today, with active or abandoned industrial and residential properties, existing railroads and roadways in close proximity to the existing 7,000-foot runway. The close proximity of these objects restricts the users from operating efficiently and safely with the appropriate load factors to the destinations desired. Takeoff and landing capabilities for cost-effective travel by Airport Reference Code C-III aircraft within a 1,500-mile range from the Gary/Chicago International Airport would not be available, reducing the economic benefits of the airport. The FAA mandate is to improve Runway Safety Areas (RSAs) nationwide by 2007. If no action is taken to correct the RSAs through improvements to Runway 12-30, Runway 12-30 will not conform to current FAA standards and will not meet the FAA mandate.

EXHIBIT 5.1-11 2007 Runway and Flight Track Utilization Percentages by Aircraft Group							
Runway (Subtrack)	Air Carrier, Cargo Air Carrier & C130	Air Taxi	GA Jets, Turboprops & Larger Props	GA Single-Engine Props		Helicopters	Overall Runway Utilization Rate
				Itinerant	Touch & Goes		
2	0.00%	2.00%	2.00%	20.00%	50.00%	0.00%	10.22%
West	0.00%	1.00%	1.00%	7.14%			
North	0.00%	0.00%	0.00%	5.71%			
East	0.00%	1.00%	1.00%	7.14%			
20	0.00%	2.00%	2.00%	20.00%	50.00%	0.00%	10.22%
East	0.00%	1.00%	1.00%	7.14%			
South	0.00%	0.00%	0.00%	5.71%			
West	0.00%	1.00%	1.00%	7.14%			
12	20.00%	16.00%	16.00%	10.00%	0.00%	0.00%	11.63%
North	5.00%	8.00%	8.00%	4.00%			
East	0.00%	0.00%	0.00%	2.00%			
South	15.00%	8.00%	8.00%	4.00%			
30	80.00%	80.00%	80.00%	50.00%	0.00%	0.00%	57.67%
North	20.00%	40.00%	40.00%	25.00%			
South	60.00%	40.00%	40.00%	25.00%			
Helicopter Tracks	0.00%	0.00%	0.00%	0.00%		100%	10.26%
Number of Ops in 2007	2,017	822	50,517	9,213	11,023	8,412	100% = 82,004

Source: Gary/Chicago International Airport

Exhibit 5.1-12 shows the DNL noise contours for the 2007 No Action alternative. Although the total number of operations is higher in comparison to 2000 Baseline Condition, the contours are slightly smaller. This is due to the changes in aircraft mix, particularly the industry's trend away from using 727s. As shown in Exhibit 5.1-10, many of the operations flown by Boeing 727s in 2000 will be replaced by MD-80 aircraft in the future. As discussed previously, this trend is already evident in the airport's operations for 2003. The net decrease in air carrier operations projected for 2007 also contributes to the slightly smaller noise contours.



Source: The Louis Berger Group, 2004

LEGEND

Location Point Key:
- L1- Corner of Grand and Columbus
- L2- St. Catherine's Hospital
- L3- Block Jr. High School
- L4- Butternut Street, Southeast Loop
- L5- Clark Street and West 4th Street
- L6- Mobile Home Park
- L7- West 5th and Chase Street
- L8- West 7th Court

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EXHIBIT 5.1-12
Future 2007 No Action
Noise Contours

April 8, 2004

5.1.5.1.2 No Action, Areas of Future Noise Exposure and Homes Impacted

Exhibit 5.1-13 shows the areas encompassed by the DNL contours. In comparison to 2000 Baseline Conditions, each contour is smaller. In addition, the size of the northwest tail of the 65 dBA contour under 2007 No Action condition is substantially reduced compared with that of 2000 condition. The southeast spike of the 65 dBA contour under 2007 No Action is also smaller compared with that of 2000 condition. The total area projected to experience DNL noise levels of 65 or greater is 1.5 square miles, or 957.3 acres. Therefore, the 65 DNL covers an area 15% smaller than the 65 DNL for 2000 Baseline Conditions. Thirty-six homes would be encompassed by the 65 DNL, which is 35 fewer homes than for 2000 Baseline Conditions. No homes or other sensitive land uses would experience noise levels that reach a DNL of 70 or more.

EXHIBIT 5.1-13
2007 No Action
Areas of Noise Exposure and Number of Homes Exposed

2007 No Action DNL Contour (dB)	Area in Acres	Residences in Areas Above the Level Defined	Schools in Areas Above the Level Defined	Hospitals in Areas Above the Level Defined
65	957.3*	36	0	0
70	420.1*	0	0	0
75+	220.4*	0	0	0

** The acreages are inclusive of higher dBA levels.*
Source: INM 6.1 model

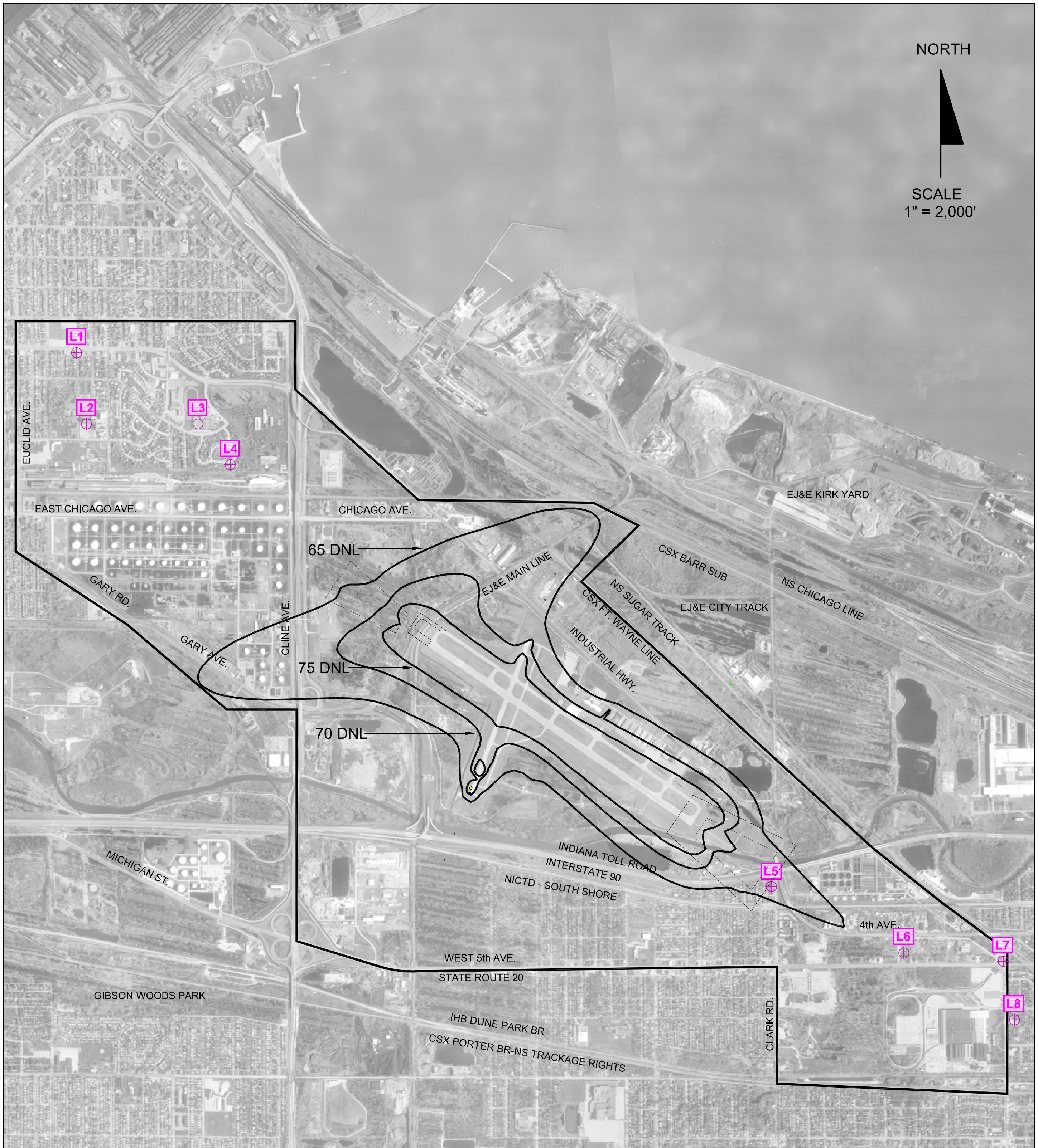
5.1.5.1.3 No Action, Future Noise Metric Values for Locations in the Community

Exhibit 5.1-12 also shows the eight specific locations for which DNL noise levels were calculated by INM 6.1. As shown in **Exhibit 5.1-14**, the noise levels range from a DNL of 47.8 at the corner of Grand Boulevard and Columbus Drive to 66.9 at the corner of Clark St. and W. 4th Avenue. This shows that noise levels associated with the airport are projected to decrease in comparison to 2000 Baseline Conditions.

EXHIBIT 5.1-14
2007 No Action
DNL Values at Noise Sensitive Locations

Location	DNL (dB)
L1. Corner of Grand Blvd & Columbus Drive	47.8
L2. St. Catherine Hospital	50.1
L3. Block Jr. High School	51.5
L4. Southeast loop of Butternut St.	53.8
L5. Clark St. & W. 4th Ave.	66.9
L6. Mobile Home Park off West 5th Ave. (Whitscomb St)	62.7
L7. Corner of West 5th Ave. & Chase St.	55.8
L8. West 7th Court	58.5

Source: INM 6.1



Source: The Louis Berger Group, 2004

LEGEND

Location Point Key:
- L1- Corner of Grand and Columbus
- L2- St. Catherine's Hospital
- L3- Block Jr. High School
- L4- Butternut Street, Southeast Loop
- L5- Clark Street and West 4th Street
- L6- Mobile Home Park
- L7- West 5th and Chase Street
- L8- West 7th Court

EXHIBIT 5.1-15

Future 2007 Runway 12-30
FAA Standards
Noise Contours

April 8, 2004

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5.1.5.2 Improvements to Existing Runway 12-30 to Conform with Current FAA Standards

5.1.5.2.1 Improvements to Existing Runway 12-30 to Conform with Current FAA Standards, Future Day-Night Average Sound Level (DNL) Noise Exposure

In the Conform with Current FAA Standards action, Runway 12-30 is extended by 546 feet to the northwest, and the Runway 30 threshold is displaced by that same amount to the northwest with the application of declared distance criteria used. The 715-foot displaced threshold for arriving aircraft on Runway 12 is eliminated due to the relocation of the rail tracks, and the beginning of the runway is now located 546 further to the northwest. The result is that approaching aircraft now land 1,261 feet further to the northwest than they did for 2000 Baseline and the 2007 No Action alternative. The additional length of the runway also allows arriving aircraft on Runway 30 to have a displaced threshold of 546 feet, which permits a runway safety area over the Calumet River that conforms to FAA standards. Since the longer runway does not affect the starting point for departing aircraft, many aircraft departing from Runway12 or 30 would lift off and execute their turns without using the full new length of the runway. All of these factors affect the configuration of the noise contours at the endpoints of Runway 12-30. Helicopter tracks, as well as flight tracks for Runways 2 and 20 would not change. The overall size and shape of the DNL contours is similar to those for 2000 Baseline Conditions and 2007 No Action Conditions, as shown in **Exhibit 5.1-15**. The number of operations and the mix of aircraft are the same as for 2007 No Action Conditions.

5.1.5.2.2 Improvements to Existing Runway 12-30 to Conform with Current FAA Standards, Areas of Future Noise Exposure and Homes Impacted

The total cumulative area encompassed by the 65 DNL is 1.47 miles, or 943.5 acres (see **Exhibit 5.1-16**). Overall, it is 1.7% smaller than the 65 DNL for 2007 No Action Conditions due to 1) the displacement of the runway thresholds towards the northwest, and 2) the fact that the noise levels from takeoffs and landings do not overlap to the same degree due to the longer runway. An estimated 33 homes would lie within the 65 DNL. No homes or other sensitive land uses would fall within a DNL of 70 or above.

EXHIBIT 5.1-16 2007 Conform with FAA Standards Areas of Noise Exposure and Number of Homes Exposed				
2007 FAA Standards DNL Contour (dB)	Area in Acres	Residences Areas Above the Level Defined	Schools Areas Above the Level Defined	Hospitals Areas Above the Level Defined
65	945.8*	33	0	0
70	417.8*	0	0	0
75+	225.0*	0	0	0

The acreages are inclusive of higher dBA levels.
Source: INM 6.1 model

5.1.5.2.3 Improvements to Existing Runway 12-30 to Conform with Current FAA Standards, Future Noise Metric Values for Locations in the Community

Exhibit 5.1-15 also shows the eight specific locations for which DNL noise levels were calculated by INM 6.1. As shown in **Exhibit 5.1-17**, the noise levels range from 49.9 at the corner of Grand Boulevard to 66.1 at the corner of Clark St. and W. 4th Avenue. In comparison to the No Action alternative, noise levels at the first two location points have increased due to changes in the locations of the arrival tracks for Runway 12. Noise levels at location points 3 and 4 are similar to the No Action alternative. Noise levels for the points at the southeast end of the runway have decreased due to the 546-foot displaced threshold for Runway 30 and the fact that departing aircraft on Runway 12 may not use the full new length of the runway before taking off and executing a turn.

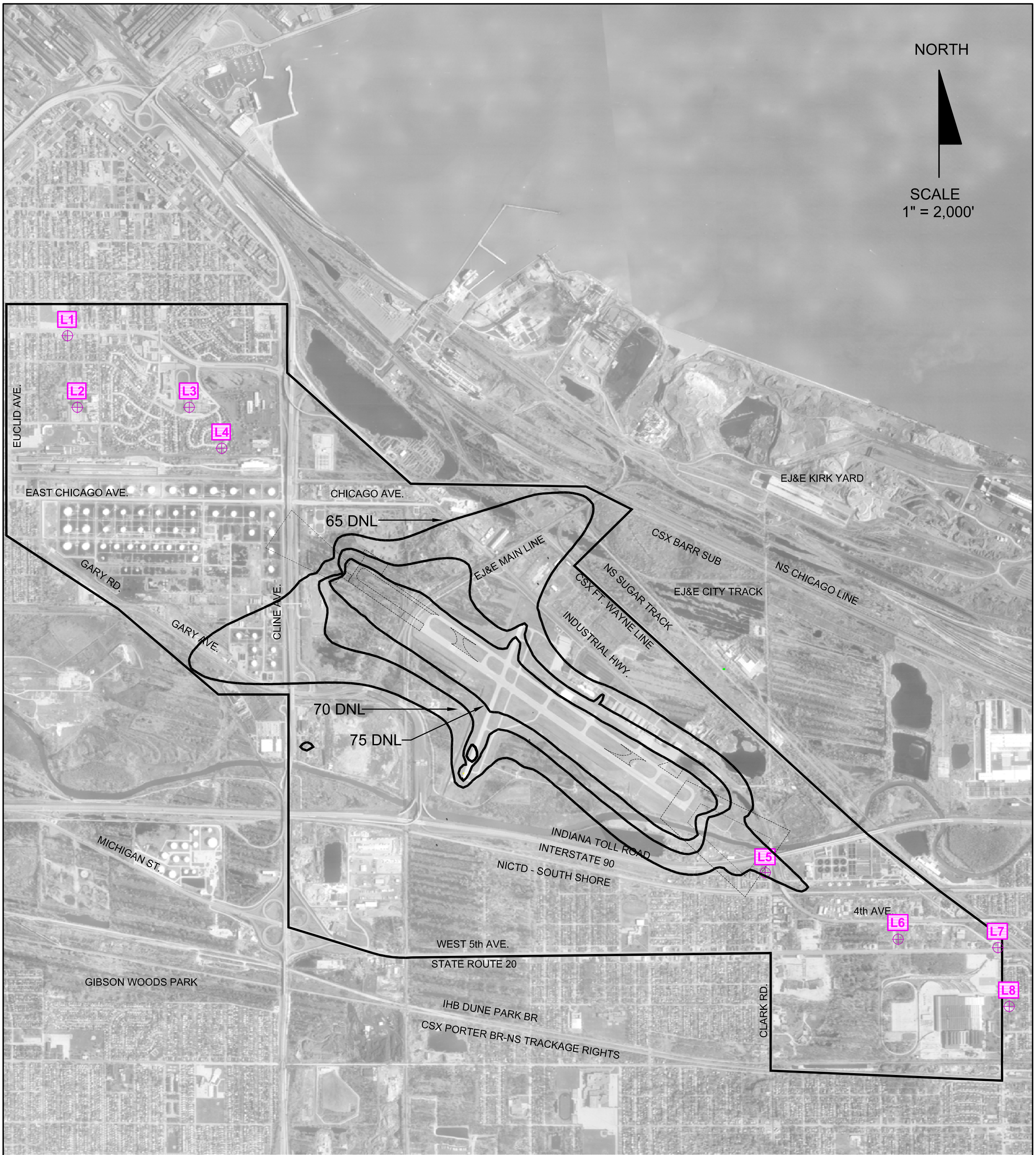
EXHIBIT 5.1-17 2007 Conform with FAA Standards DNL Values at Noise Sensitive Locations	
Location	DNL (dB)
L1. Corner of Grand Blvd & Columbus Drive	49.9
L2. St. Catherine Hospital	51.9
L3. Block Jr. High School	51.1
L4. Southeast loop of Butternut St.	53.7
L5. Clark St. & W. 4th Ave.	66.1
L6. Mobile Home Park off West 5th Ave. (Whitscomb St)	61.8
L7. Corner of West 5th Ave. & Chase St.	54.6
L8. West 7th Court	58.0

Source: INM 6.1

5.1.5.3 Improvements to Provide Additional Runway Length on Runway 12-30

5.1.5.3.1 Improvements to Provide Additional Runway Length on Runway 12-30, Future Day-Night Average Sound Level (DNL) Noise Exposure

Improvements associated with the extension of Runway 12-30 include an approximately 1,354-foot extension to the northwest on Runway 12 proposed in conjunction with the approximately 546-foot extension to Runway 12 to provide safety areas conforming to FAA standards (total extension 1,900 feet). As a result the flight tracks for departing and arriving flights on Runway 12 would be displaced to the northwest, as with the Conform with Current FAA Standards Action although to a greater extent, while many aircraft departing from Runway 30 would lift off and execute their turns without using the full new length of the runway. As with the Conform with Current FAA Standards Action, arrivals for Runway 30 would be landing 546-feet to the northwest as compared with No Action. This changes the configuration of the noise contours at the northwest end of Runway 12-30. Tracks on the other runways would remain the same as discussed in 2007 No Action Conditions. The number of operations and the mixture of aircraft also would be the same as for the No Action alternative and the Conform with Current FAA Standards Action. As shown in **Exhibit 5.1-18**, the general size and shape of the contours is similar to those for the other alternatives. Although the longer runway would permit some aircraft to utilize a greater takeoff weight and/or carry more fuel for a longer flight stage, no data for projecting these variables at Gary is currently available, and they were not considered in the INM modeling. Given the strong influence of the GA operations on the flight contours for 2007, potential changes in the weight or trip length for a small number of commercial aircraft would not significantly affect the size and shape of the 65 DNL contours.



Source: The Louis Berger Group, 2004

LEGEND
Location Point Key: L1- Corner of Grand and Columbus L2- St. Catherine's Hospital L3- Block Jr. High School L4- Butternut Street, Southeast Loop L5- Clark Street and West 4th Street L6- Mobile Home Park L7- West 5th and Chase Street L8- West 7th Court

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EXHIBIT 5.1-18
Future 2007
Extended Runway 12-30
Noise Contours

April 8, 2004

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5.1.5.3.2 Improvements to Provide Additional Runway Length on Runway 12-30, Areas of Future Noise Exposure and Homes Impacted

Exhibit 5.1-19 shows the cumulative areas encompassed by the DNL contours. The area above the 65 DNL is 1.48 square miles, or 948.1 acres. This acreage is greater than the acreage for the alternative to conform to current FAA standards, but less than the acreage for the No Action alternative due to the extended runway and the manner in which the noise levels from takeoffs and landings overlap. Under this alternative, the threshold (end) of the Runway 12 would be shifted toward the northwest, the same as the Conform with Current FAA Standards Action. Some aircraft may take off at an earlier point (towards northwest), as compared with the No Action condition, after the roll up is completed when departing from Runway 30. Meanwhile, the arriving aircraft would also touch down at a point further towards the northwest, when they approach Runways 12 and 30. As a result, the noise contour would shift slightly towards the northwest. The southeast tip of the noise contours would also shrink as compared with those of No Action condition. Compared with the 2007 No Action conditions, there is a net benefit. Twenty-two homes are within the area experiencing noise levels of 65 DNL or more, which is a fewer number of homes than for the No Action Alternative or the alternative to conform to current FAA standards. No noise sensitive uses fall within the 70 or 75 DNL. Since this alternative causes fewer impacts to noise sensitive uses than the No Action Alternative, there is a net benefit.

EXHIBIT 5.1-19
2007 Runway Extension
Areas of Noise Exposure and Number of Homes Exposed

2007 Runway Extension DNL Contour (dB)	Area in Acres	Residences	Schools	Hospitals
65	948.1*	22	0	0
70	445.4*	0	0	0
75	247.9*	0	0	0

The acreages are inclusive of higher dBA levels.
Source: INM 6.1 model

5.1.5.3.3 Improvements to Provide Additional Runway Length on Runway 12-30, Future Noise Metric Values for Locations in the Community

Exhibit 5.1-18 shows the eight specific locations for which DNL noise levels were calculated by INM 6.1. As shown in **Exhibit 5.1-20**, the noise levels range from a DNL of 50.5 at the corner of Grand Boulevard and Columbus Drive to 64.5 at Clark St. and W. 4th Avenue. In comparison to No Build Conditions, the noise levels have increased for two locations farthest to the northwest and decreased at the others, especially those at the southeast. In addition, the location at Clark St. and W. 4th Avenue now falls outside of the 65 DNL, which is a net noise level benefit. The increases shown for some of the other points do not constitute impacts because the noise levels are below a DNL of 65.

EXHIBIT 5.1-20
2007 Runway Extension
DNL Values at Noise Sensitive Locations

Location	DNL (dB)
L1. Corner of Grand Blvd & Columbus Drive	50.5
L2. St. Catherine Hospital	53.2
L3. Block Jr. High School	51.0
L4. Southeast loop of Butternut St.	53.7
L5. Clark St. & W. 4th Ave.	64.5
L6. Mobile Home Park off West 5th Ave. (Whitscomb St)	60.8
L7. Corner of West 5th Ave. & Chase St.	52.2
L8. West 7th Court	57.8

Source: INM 6.1

5.1.5.4 Expansion of Existing Terminal Building

The planned improvements under this alternative would not cause an increase in aircraft noise. Therefore, noise levels and noise contours would not be affected.

5.1.5.5 Acquisition and/or Reservation of Sites for Future Passenger Terminal and Air Cargo Facilities

The planned improvements under this alternative would not cause an increase in aircraft noise. Therefore, noise levels and noise contours would not be affected.

5.1.6 Highway Noise

5.1.6.1 Methodology

This study uses Federal Highway Administration (FHWA) and Indiana Department of Transportation (INDOT) Noise Abatement Criteria for assessing highway noise in the airport vicinity. The FHWA Noise Abatement Criteria (NAC) in *23 CFR Part 772*, which is adopted by INDOT, and INDOT's substantial noise level increase over existing criteria were used to evaluate any potential impact. The FHWA NAC is presented in **Exhibit 5.1-21**. In contrast to airport noise, the 1-hour Leq is used to evaluate impacts instead of a 24-hour DNL.

EXHIBIT 5.1-21
FHWA Noise Abatement Criteria (NAC)
Hourly A-weighted Sound Level in decibels (dBA)

Activity Category	Noise Abatement Criteria Leq dBA	Description of Activity Category
A (Exterior)	57	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B (Exterior)	67	Picnic areas, recreation areas, playgrounds, active sports areas, and parks that are not included in Category A; and residences, motels, hotels, public meeting rooms, schools, churches, libraries and hospitals.
C (Exterior)	72	Developed lands, properties or activities not included in Categories A or B above.
D	-	Undeveloped lands.
E (Interior)	52	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

Source: Title 23 Code of Federal Regulations Part 772.

Based on this information, the Indiana Department of Transportation considers noise mitigation measures when:

- Leq (h) noise levels approach within one dBA of or exceed the FHWA NAC. For residential areas, this would be an Leq (h) of 66 dBA in outdoor areas.
- The relative increase in predicted noise levels over the existing noise levels approaches within one dBA of 15 dBA. This results in a criterion of 14 dBA for determining an impact

Noise is generated by the traffic on Interstate 90 (I-90), the Indiana Toll Road, to the south; Cline Avenue (SR 912) to the west; Chicago Avenue (currently designated SR 312) to the northwest, and Industrial Highway (currently designated US 12) to the northeast of the Gary/Chicago International Airport. For 2000 Baseline Conditions, noise levels from traffic on these roadways were estimated using Version 2.1 of the Traffic Noise Model (TNM), which is the FHWA's currently accepted noise modeling program. The application of the model was based on the centerline of the roadway. Topography was assumed to be flat in the vicinity of the receptor points on Industrial Highway and Chicago Avenue. This provides a worst-case scenario because noise travels the farthest when the land is flat and open. Given the generally elevated nature of the I-90 between Cline Avenue and east of Clark Street and Client Avenue south of Industrial Highway,, an elevation of 20 feet above the adjacent lands was modeled for the receptors along the segment of I-90 south of Runway 30 and Client Avenue to the northwest of the airport. Other data inputs to the model include distances between each neighborhood receptor and the centerline of the nearest roadway, as well as traffic information. Additional receptor points were placed at distances of 50 feet from the centerline as appropriate to help define the rate of noise attenuation.

For future No Action and Build Conditions, the relative increases in noise levels were calculated from the relative increases in traffic. Because the decibel scale is logarithmic, a doubling of the noise source in this case the traffic volume results in a 3 dBA increase in noise level. Therefore, the relative increase in noise levels can be calculated directly from the relative increase in traffic, assuming that the projected mixture of autos and trucks is the same for No Action and Build Conditions.

5.1.6.2 Baseline Highway Noise –2000

Noise is typically loudest when traffic volumes are highest. Therefore, the peak-hour morning traffic (i.e., 7:30 – 8:30 a.m.) and peak-hour afternoon traffic (i.e., 5 – 6 p.m.) volumes were entered into the TNM model. These volumes were based on year 1999-2000 traffic data available from INDOT's Long Range Needs Study, and Division of Roadway Management's traffic counts. The Long Range Needs Study estimated 90% of total traffic is autos and 10% is commercial vehicles on I-90. Since detailed information on percentages of buses, medium trucks and heavy trucks for 1999-2000 was unavailable, medium trucks and heavy trucks were each assumed to be 5% of the total traffic volume as is typical for roadways of this type. These truck percentages were also applied to Cline Avenue, since there is heavy commuter traffic on this road. All three classes of traffic were entered separately into the model. The results of the traffic noise level calculation for each roadway are presented in **Exhibits 5.1-22, 5.1-23, 5.1-24** and **5.1-25.**

EXHIBIT 5.1-22
2000 Baseline I-90 Traffic Noise Levels

Distance from Roadway Center Line to Receptor Locations (feet)	Peak Traffic Hour Leq (dB)
150	68
250	67
300	65
350	64
450	63
500	62
600	61

Source: Traffic Noise Model, Version 2.1

EXHIBIT 5.1-23 2000 Baseline Cline Avenue (SR 912) Traffic Noise Levels	
Distance from Roadway Center Line to Receptor Locations (feet)	**Peak Traffic Hour Leq (dB)**
150	68
200	68
250	67
300	66
350	65
400	64
500	63
600	52
700	61
800	60

Source: Traffic Noise Model, Version 2.1

EXHIBIT 5.1-24 2000 Baseline Industrial Highway (US 12) Traffic Noise Levels	
Distance from Roadway Center Line to Receptor Locations (feet)	**Peak Traffic Hour Leq (dB)**
100	67
150	64
200	61
300	58
400	56
500	54
600	53

Source: Traffic Noise Model, Version 2.1

EXHIBIT 5.1-25 2000 Baseline Chicago Avenue (SR 312) Traffic Noise Levels	
Distance from Roadway Center Line to Receptor Locations (feet)	**Peak Traffic Hour Leq (dB)**
100	63
150	60
200	57
400	52
500	50
600	48

Source: Traffic Noise Model , Version 2.1

Peak hour traffic destined for the airport includes passenger vehicles, employee vehicles, and vehicles associated with air cargo and general aviation activities. For 2000, an estimated 397 vehicular trips[1] were generated by the airport during the peak hour traffic period. Of these, 386 were private autos, two were rental cars, six were buses, and three were trucks, as discussed in Chapter 2, Purpose and Need, of this EIS. The peak-hour distribution of this traffic on highways

[1] A vehicular trip is one that arrives or departs. A vehicle that enters the airport, drops off a passenger, and leaves would count as two trips.

adjacent to the airport ranges from seven vehicles (0.5% of total volume) on I-90 west of SR 912 to 194 vehicles (36.3% of total volume) on US 12 between SR 312 and the airport. Airport-generated traffic on SR 912 and I-90 is below 5% of total traffic. On the I-90 segments, airport volumes of seven to 37 vehicles are 0.5% to 1.8% of the peak-hour background volumes that range from 1,369 to 2,315. On the SR 912 segments, airport volumes of about 100 vehicles are approximately 3.5% of the peak-hour background volumes of 2,738. The airport traffic volumes are so low, compared to background traffic, that airport traffic accounts for 0.1 to 0.2 dBA of the Leq and is not perceptible as a source of the modeled noise levels on I-90 and SR 912 for 2000 Baseline Conditions. This is based on the fact that noise is on a logarithmic scale. A traffic generator that doubles the volume on a roadway would increase noise levels by 3 dBA. Thus, on a roadway where airport traffic represents approximately 50% of the volume (i.e., doubles the volume in comparison to background traffic), the contribution to total noise levels would be 3 dBA.

For the other modeled roadways, peak hour airport traffic may account for up to 2 dBA of the modeled noise levels. On the relevant SR 312 links, peak-hour airport volumes of approximately 105 to 110 vehicles account for 27to 33 %, respectively, of the total volumes of 387 (West Bound (WB)) and 335 (East Bound (EB)). This traffic adds 1.4 to 1.7 dBA to the noise from background traffic for these links. Similarly, airport traffic volumes on key US 12 segments range from 49 (8.2% of a total of 604) to 194 (36% of a total of 534) during the peak traffic periods. Airport-generated volumes between the airport and the I-90 underpass are 47 (EB) and 49 (WB). Given the background traffic of 340 (EB) and 555 (WB), airport volumes add 0.4 to 0.6 dBA to the noise generated by background traffic. Between SR 312 and the airport, the volumes on US 12 include 186 generated by the airport.

5.1.6.3 Future Highway Noise -- 2007

5.1.6.3.1 No Action

Under 2007 No Action Conditions, traffic volumes would increase by 0.15% per year, which is an overall increase of approximately 1.1% over the seven-year period from 2000 to 2007. This growth in traffic would not be sufficient to cause a noticeable increase in noise levels. Thus, the noise levels under the No Action Alternative would be substantially the same as for 2000 Baseline Conditions.

5.1.6.3.2 Improvements to Existing Runway 12-30 to Conform to Current FAA Standards

The planned improvements under this alternative would not cause an increase in airport traffic. Therefore, noise levels would be substantially the same as for 2007 No Action conditions.

5.1.6.3.3 Improvements to Provide Additional Runway Length on Runway 12-30

The planned improvements under this alternative would not cause an increase in airport traffic. Therefore, noise levels would be substantially the same as for 2007 No Action conditions.

5.1.6.3.4 Expansion of Existing Terminal Building

The planned improvements under this alternative would not cause an increase in airport traffic. Therefore, noise levels would be substantially the same as for 2007 No Action conditions.

5.1.6.3.5 Acquisition and/or Reservation of Sites for Future Passenger Terminal and Air Cargo Facilities

The planned improvements under this alternative would not cause an increase in airport traffic. Therefore, noise levels would be substantially the same as for 2007 No Action conditions.

5.1.7 Rail Noise

5.1.7.1 Methodology

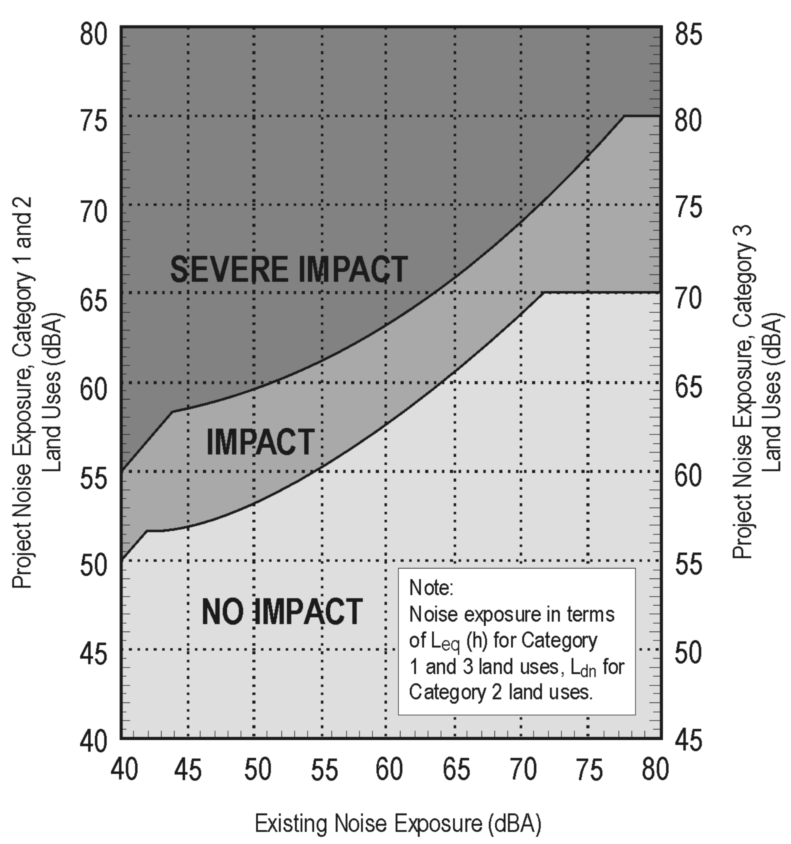
There are two relevant sets of criteria for evaluating rail noise in the study area. They are the Federal Transit Administration/Federal Railway Administration criteria, and the American Public Transit Association (APTA) Criteria. Each of these is discussed below.

5.1.7.1.1 Federal Transit Administration (FTA) and Federal Railway Administration (FRA) Criteria

The FTA has developed noise and vibration assessment methodologies and impact criteria for mass transportation projects, as contained in the 1995 *Transit Noise and Vibration Impact Assessment*. The noise impact criteria are based on a comparison of the existing and future outdoor noise levels from the proposed project, and were developed based on human annoyance caused by noise. FTA criteria provide a good benchmark for evaluating projected noise levels from the operations of the proposed new project. However, it cannot be directly applied to any facilities currently in existence. Because of the similarity shared by both transit and rail facilities, except for high speed rail system, the FRA has adopted the FTA's criteria for railway operation related noise studies.

Exhibit 5.1-26 depicts the Noise Impact Criteria for Transit and Rail Projects. The Land Use Categories and Metrics for Transit Noise Impact Criteria are presented in the table of **Exhibit 5.1-27**. The noise criteria and the descriptors used to evaluate project noise are dependent on the type of land use in the vicinity of the proposed project. Land Use Category 1 includes tracts of land where quiet is an essential element in their intended purpose. Category 2 includes residences and buildings where people sleep. Category 3 includes institutional land uses with primarily daytime and evening use such as schools, places of worship and libraries. The criteria do not apply to most commercial or industrial uses because, in general, the activities within these buildings are compatible with higher noise levels.

EXHIBIT 5.1-26 Noise Impact Criteria for Transit Projects



Source: FTA 1995 Transit Noise and Vibration Impact Assessment

EXHIBIT 5.1-27 Land Use Categories and Metrics for Transit Noise Impact Criteria		
Land Use Category	**Noise Metric (dBA)**	**Description of Land Use Category**
1	Outdoor $L_{eq}(H)^*$	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq}(H)^*$	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios and concert halls fall into this category. Places for meditation or study associated with cemeteries, monuments, museums. Certain historical sites, parks and recreational facilities are also included.

*L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.
Source: Federal Transit Administration, Transit Noise and Vibration Assessment, April 1995.

5.1.7.1.2 The American Public Transit Association Criteria

In addition, the APTA has developed guidelines for allowable maximum airborne noise level from train operations. The appropriate metric, according to APTA guidelines, is the single event maximum level (Lmax).

The APTA guidelines are design goals only and are not enforceable. Under the APTA guidelines, a maximum pass-by noise level of 75 dBA is allowable for residential areas and a maximum noise level (Lmax) of 85 dBA is allowable for commercial and industrial land uses (see **Exhibit 5.1-28**).

EXHIBIT 5.1-28 Guidelines for Maximum Airborne Noise From Train Operations			
	Single Event Maximum Noise Level Design Goal*		
Community Area Category	**Single-Family Dwellings**	**Multi-Family Dwellings**	**Commercial Buildings**
1) Low-Density Residential	70 dBA	75 dBA	80 dBA
2) Average Residential	75 dBA	75 dBA	80 dBA
3) High-Density Residential	75 dBA	80 dBA	85 dBA
4) Commercial	80 dBA	80 dBA	85 dBA
5) Industrial	80 dBA	85 dBA	85 dBA

*These design goal guidelines are applied to nighttime operations because the sensitivity to noise is greater at night than during daytime hours. These guidelines should be applied outdoors and to the building or area under consideration, not closer than 50 feet from the track centerline. Because of the transient nature of train noise, community acceptance should be expected if the noise levels do not exceed these guidelines at night at the affected buildings or use areas.

Source: U.S. Department of Transportation, Urban Mass Transportation Administration, Handbook of Urban Rail Noise and Vibration Control, UMTA-MA-06-0099-82-1, February 1982.

5.1.7.2 Baseline Railway Noise – 2000

Existing rail tracks are located to the north, east and west of the Gary/Chicago International Airport. These rail lines provide freight and passenger services to local and national destinations. The improvements to the existing Runway 12-30 and an extension of Runway 12-30 would require alignment and/or profile changes to the EJ&E Railway immediately west of Runway 12-30. Noise levels from train operations on this rail line were calculated utilizing FTA "General Transit Noise Assessment" methodology and rail operation information provided by TranSystems, a consultant hired by the airport to assess rail relocation alternatives for the EJ&E Railway.

Existing noise levels from the railroad were calculated based on a simplified application of the FTA methodology. The application is simplified in that no field measurement was made, and no effort was made to enter specific information about the topography of the railways and neighborhood receptors into the calculation model. Instead, the location of the centerline of the railroad was used and an assumption that the topography is generally flat on the ground, where the receptors are located, was made.

In addition to the topographic assumptions, other data inputs include distances between each neighborhood receptor and the nearest roadway, as well as traffic information. In terms of distances, the closest distance between the centerline of the railroad and the receptor was calculated. Each incremental distance of 50 or 100 feet from the centerline was also calculated for each railway, as appropriate.

The existing train operations on the existing rail line immediately west of the Runway 12-30 include a maximum 12 trains per day. Of these 12 trains, approximately four occur during the day and remaining eight occur during the night. Each train has a maximum of three locomotives and 125 cars. Although the posted speed is 50 miles per hour, the actual operating speed, which was utilized in noise level calculation, is expected at or below 30 miles per hour. This is because the trains are starting to slow down in anticipation of the sharp turning movement at the north end of the rail line. Noise levels of DNL, L_{eq}-day and L_{eq}-night were calculated and presented in the table of **Exhibit 5.1-29**. As can be seen from Exhibit 5.1-29, existing DNL noise levels are higher than day-time and nighttime L_{eq} levels, and nighttime L_{eq} are higher than daytime L_{eq}, as a result of heavier nighttime operations.

EXHIBIT 5.1-29
Existing and Future Railway Operation Noise Levels

Distance from rail center line to receptor locations (feet)	DNL (dB)	Leq-day (dB)	Leq-night (dB)
40	75	65	69
50	73	64	67
60	72	62	66
100	69	59	63
150	66	57	60
180	65	55	59
200	64	55	58

Source: The Louis Berger Group, Inc. September 6, 2002.

In addition, noise measurements were conducted at two locations, near the existing railroad and the proposed railway alignment in order to identify baseline noise levels in the area adjacent to the proposed railway realignment. Each location was measured for short-term periods of 3 to 6 hours during daytime hours, between 7:00 am and 4:00 pm. Since the predominate noise source is traffic on existing roadways and there are no residential properties considered to be sensitive during the nighttime hours in close proximity of the proposed railway relocation, noise measurements were only conducted during the daytime hours, specifically during peak traffic hours to assess the existing noise levels. Measurements were taken during both the peak-traffic and non-peak-traffic hours at representative locations. Diesel trucks, passenger cars and the occasional train were the dominant noise sources identified. Noise measurement locations are presented in **Exhibit 5.1-30**. Noise measurement results are presented in **Exhibit 5.1-31**.

Source: The Louis Berger Group, 2004

LEGEND
R1 - Existing Railway R2- Proposed Railway

Gary/Chicago International Airport
Chicago's Best Approach!

EXHIBIT 5.1-30

Railway Noise Measurement Locations

April 8, 2004

EXHIBIT 5.1-31 Noise Measurement Results- 1-Hour Measurement Sites						
Site ID	**Address**	**Land Use**	**Date**	**Start Time**	**Leq (dBA)**	**Ldn(dBA)**
R1	Industrial Highway & Railroad Overpass	Industrial/ Manufacturing	10/16/2003	10:00 am	79	81
			10/16/2003	11:00 am	78	
			10/15/2003	12:00 pm	78	
			10/15/2003	1:00 pm	81	
			10/15/2003	2:00 pm	86*	
			10/15/2003	3:00 pm	79	
R2	Cline Avenue & Chicago Avenue	Industrial/ Manufacturing	10/16/2003	7:00 am	81	81
			10/16/2003	8:00 am	81	
			10/16/2003	9:00 am	80	

** High noise level attributed to gust wind with speeds of 12 mph or higher during this measurement period.*
Source: The Louis Berger Group, Inc., October 2003.

Noise was measured with a Bruel & Kjaer 2260, a Type I accuracy noise measuring equipment. The equipment was located approximately 50-100 feet from the existing roadway pavement. Measurements were closely supervised and unusual noises were recorded during the entire time period. Noise measurements, site photographs and a Field Noise Monitoring Sheet were completed at each site. Variables such as site surface, pavement type, nearby landmark, distance to landmark, land direction, address, observer, grade, temperature, wind speed, and a sketch of the study area were identified.

Hourly noise levels were measured at Site R1, located at the intersection of Industrial Highway (westbound) and the existing railroad overpass, in the city of Gary, Indiana. The noise monitoring equipment was placed approximately 100 feet from the base of the railroad overpass. Average hourly noise levels L_{eq} in this industrial and manufacturing area ranged from 78 dBA to 86 dBA during the day time hours. Except for one measurement of 86 dBA at 2 p.m. on October 15, 2003, during which a strong wind exceeding 12 mph occurred, all noise levels measured within a 3-dBA range between 78 and 81 dBA. Vehicular traffic on Industrial Highway, freight trains and overhead aircraft were the predominant noise sources identified. Several freight train pass-bys were observed during the field investigations. The noise levels during train pass-bys were generally higher than the background noise levels. Maximum levels of 92 and 88 dBA were measured, during freight trains pass-bys, compared to a measurement of 76 dBA for overhead aircraft.

However, it should be noted that average L_{eq} levels were not affected by the rail and aircraft noise since the events associated with rail and aircraft operations lasted for only a short period of time, i.e., minutes or even seconds. The constant automobile and truck traffic on the roadways kept the noise level readings at approximately 80 dBA. The 24-hour Ldn level is estimated to be 81 dBA.

Hourly noise levels were also measured at Site R2, at the intersection of Cline Avenue overpass and Chicago Avenue (westbound), close to the proposed railway relocation. The noise monitoring equipment was placed approximately 50 feet from the edge of pavement. Noise levels at this site ranged from 80 dBA to 81 dBA during daytime hours. Predominant noise sources came from vehicular traffic on the Cline Avenue Overpass and Chicago Avenue and trains on an existing railroad track north of Chicago Avenue. The highest instantaneous noise level of 89 dBA was measured on October 16th 2003, from a passing train at 8:54 a.m. Peak train pass-by noise levels of 79 dBA and 88 dBA were also measured at 7:37 a.m. and 8:06 a.m., respectively. During the field measurement period, many large trucks traversed Chicago Avenue as they made their way to connect to Industrial Highway. Similar to Site R1, average hourly noise levels were not affected by the occasional train pass-bys and aircraft flyovers. The 24-hour Ldn level is estimated to be 81 dBA at this site

5.1.7.3 Future Railway Noise --2007

5.1.7.3.1 No Action

Without the proposed relocation, the railway alignment and operations will remain unchanged and noise increase would not be expected. Therefore, noise impact would not be expected either.

5.1.7.3.2 Railroad Relocation

The receptors adjacent to the relocated railway alignment will experience an increase in new noise sources resulting from the new rail traffic. However, this new noise source is not anticipated to impact the receptors in the area, due to the already present high noise levels, i.e. 80 dBA based on the existing noise level measurement. The area adjacent to the proposed railway relocation is heavy industrial in nature and is not considered to be sensitive to noise and vibration based on FRA/FTA guidelines. In the future, airport expansion may require redevelopment of the area into a new terminal, which could be considered as an institutional use or Category 3 receptor since the terminal will serve as a stopping area where people would rest and refresh for short periods of time. The noise threshold level for identifying impact at institutional receptors with an existing noise level of 80 dBA is 70 dBA Leq per the FTA guideline (Exhibit 5.1-25). Based on information presented in Exhibit 5.1-28, the noise level Leq from train operations (including both day and night operations) at 100 feet would be in the range of 59 to 63 dBA, a level far smaller than 70 dBA. The 24-hour Ldn level attributable to train operations is 69 dBA, which is less than FTA 70 dBA criteria for identifying impacts. Therefore, there would not be any significant noise impact from the proposed railway relocation.

The FRA/FTA train horn noise model was utilized to model the potential noise impacts from train horns. The impact distance for train horn noise is approximately 500 feet. The new grade crossing is not located in a residential area. The closest residential areas are at least 700 feet away. The existing embankments will act as a noise barrier between the crossing and the residential sections. Furthermore, it is expected that there will only be a few train pass-bys during the nighttime. Therefore, noise impact at receptors adjacent to the relocated railway alignment would not be expected.

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